

# A New Fit to $K\pi$ Wrong Sign

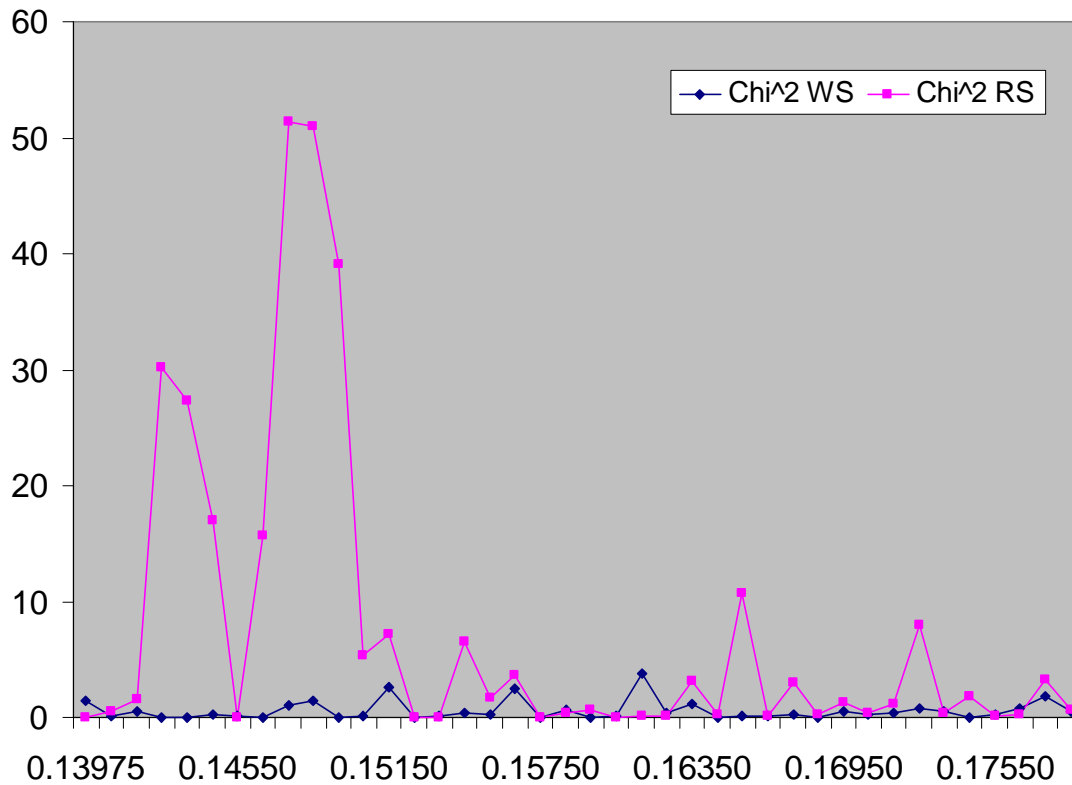
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Milano Meeting

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# What's Wrong with the Current Fit?

$\chi^2$  For the Double Gaussian Fit by Points



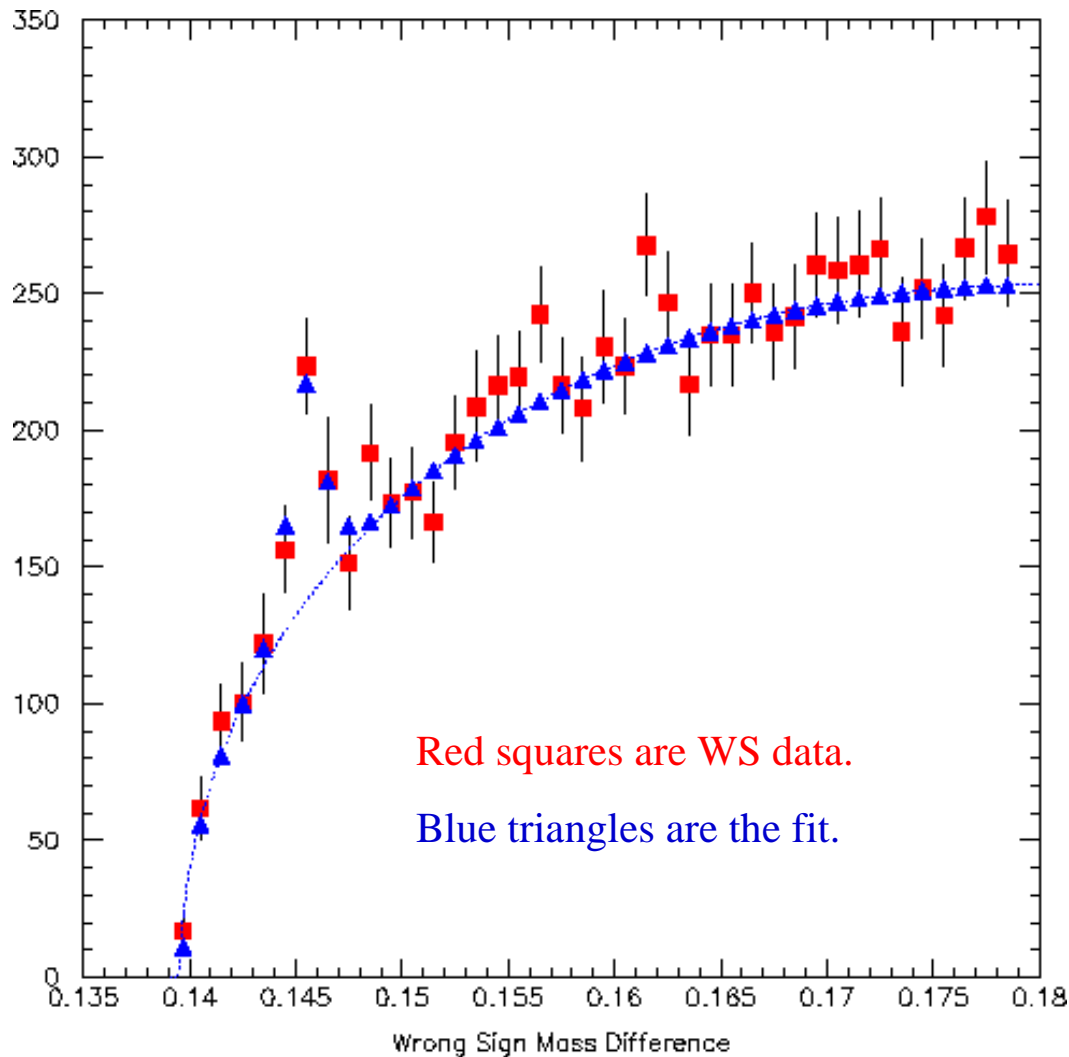
$$\chi^2/\text{ndf} = 318/80$$

The high  $\chi^2$  is due to the poor signal shape model.

But what is the correct model?

$$BR = (0.431 \pm 0.094)\%$$

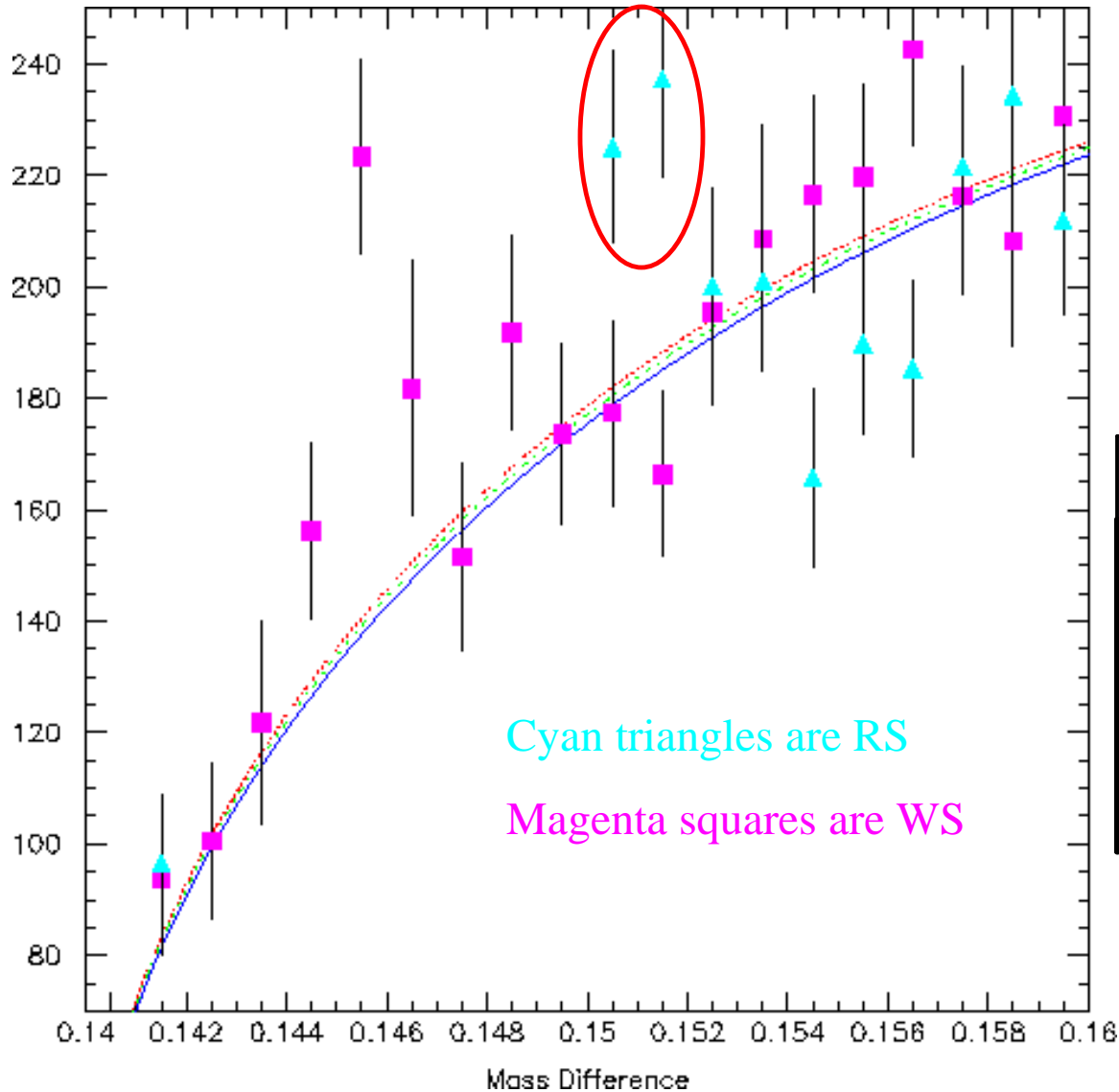
# New Fit Method



- Mask off RS signal region.
- Fit RS and WS background to the same 2 parameter function:
$$f(x) = a(x - m_p)^{1/2} + b(x - m_p)^{3/2}$$
- Scale RS signal, from data, to match WS signal.

The scale factor is the  
Branching Ratio!

## How Should the Mask Region be Chosen?



- The points circled in red draw the BG fit up when they are included in the fit.

- And they lower the BR.

| # Mskd   | BR                  | $\chi^2/\text{ndf}$ |
|----------|---------------------|---------------------|
| 8        | $0.4560 \pm 0.0918$ | 86.3/69             |
| 9        | $0.4680 \pm 0.0919$ | 79.7/68             |
| 10       | $0.4816 \pm 0.0920$ | 71.1/67             |
| Full fit | $0.431 \pm 0.094$   | 318/80              |

- This difference is consistent with the statistical errors on the BG parameters.

# Conclusion

- New fit method has a superior  $\chi^2/\text{ndf}$ .
- It gives the highest branching ratio of any of the methods.
- But a study of the RS plot indicates that this choice of masked region is the most logical.

## Work Still to be Done

- Try to improve the  $D^0$  fit, especially in the RS signal region.
- Systematic study of systematic errors.
- The draft is in preparation, including the study suggested by Jim.

<http://www-focus.fnal.gov/link/kpi/draft.html>